

INTEGRATED ACADEMIC STUDIES OF PHARMACY

SECOND YEAR OF STUDY

Academic year 2026/2027

Course:

ORGANIC CHEMISTRY 2

The course is worth 6 ECTS credits. It includes 5 hours of active instruction per week (3 hours of lectures and 2 hours of small-group work)

TEACHING STAFF AND ASSOCIATES:

No.	Full name	Email address	Academic title
1.	Andriana M. Bukonjić	andriana.bukonjic@medf.kg.ac.rs	Assistant Professor
2.	Snežana Jovanović Stević	snezana.j@kg.ac.rs	Assistant Professor
3.	Ana S. Živanović	ana_stankovic@outlook.com	Assistant Professor

COURSE STRUCTURE:

Module	Module title	Weeks	Lectures	Small-group work	Module coordinator
1	Structures of organic compounds. Organic reactions. Chemical bonding. Electronic effects in organic molecules. Stereochemistry.	5	3	2	Dr Snežana Jovanović Stević, Assistant Professor
2	Stereochemistry of acyclic, cyclic and unsaturated compounds. Intermolecular forces. Acid-base equilibrium systems in organic chemistry.	5	3	2	Dr Andriana Bukonjić, Assistant Professor
3	Heterocyclic compounds with one and two heteroatoms.	5	3	2	Dr Ana Živanović, Assistant Professor
					Σ 45+30=75

ASSESSMENT:

Students complete the course by modules. The grade corresponds to the number of points earned (see tables). Points are earned in two ways:

CLASS PARTICIPATION: Students can earn up to 30 points in this way. During a designated part of the practical class, the student answers two examination questions from that week and receives 0–2 points according to the demonstrated knowledge.

FINAL EXAM: Students can earn up to 70 points in this way.

MODULE		MAXIMUM POINTS		
		class participation	final exam	Σ
1	Structures of organic compounds. Organic reactions. Chemical bonding. Electronic effects in organic molecules. Stereochemistry.	10		10
2	Stereochemistry of acyclic, cyclic and unsaturated compounds. Intermolecular forces. Acid-base equilibrium systems in organic chemistry.	10		10
3	Heterocyclic compounds with one and two heteroatoms.	10		10
	Final exam		70	70
	Σ	30	70	100

The final grade is determined as follows:

To pass the course, a student must earn at least 51 points and pass all modules.

To pass a module, a student must:

1. earn more than 50% of the points available for that module
2. earn more than 50% of the points allocated to class participation in each module
3. pass the module test, i.e. answer more than 50% of the questions correctly

POINTS EARNED	GRADE
0 - 50	5
51 – 60	6
61 – 70	7
71 – 80	8
81 – 90	9
91 - 100	10

MODULE TESTS

ASSESSMENT OF THE FINAL TEST

The test consists of 35 questions
Each question is worth 2 points

LITERATURE:

MODULE	TEXTBOOK TITLE	AUTHORS	PUBLISHER	LIBRARY
Structures of organic compounds. Organic reactions. Chemical bonding. Electronic effects in organic molecules. Stereochemistry.	Fundamentals of Theoretical Organic Chemistry and Stereochemistry	Dr Mihailo Lj. Mihailović	Građevinska knjiga, Belgrade, 1972.	Available
Stereochemistry of acyclic, cyclic and unsaturated compounds. Intermolecular forces. Acid-base equilibrium systems in organic chemistry.	Fundamentals of Theoretical Organic Chemistry and Stereochemistry	Dr Mihailo Lj. Mihailović	Građevinska knjiga, Belgrade, 1972.	Available
Heterocyclic compounds with one and two heteroatoms.	Introduction to the Chemistry of Heterocyclic Compounds	S. Pavlov	University of Belgrade, Faculty of Pharmacy, Belgrade, 1997.	Available
Additional literature	Organic Chemistry	P. C. Vollhardt, N. E. Schore	Hajdigraf, Belgrade, 1996.	Available
All lectures and small-group work materials are available on the website of the Faculty of Medical Sciences: www.medf.kg.ac.rswww.medf.kg.ac.rs				

SYLLABUS

MODULE ONE: STRUCTURES OF ORGANIC COMPOUNDS. ORGANIC REACTIONS. CHEMICAL BONDING. ELECTRONIC EFFECTS IN ORGANIC MOLECULES. STEREOCHEMISTRY.

TEACHING UNIT 1 (WEEK ONE):

STRUCTURES OF ORGANIC COMPOUNDS. ORGANIC REACTIONS

lectures: 3 hours	small-group work: 2 hours
Kekulé structural theory Structural isomerism Configuration, stereoisomerism and conformation Functional groups and hydrocarbon groups Organic reactions	Kekulé structural theory Structural isomerism Configuration, stereoisomerism and conformation Functional groups and hydrocarbon groups Organic reactions

TEACHING UNIT 2 (WEEK TWO):

CHEMICAL BONDING

lectures: 3 hours	small-group work: 2 hours
Atomic structure Types of chemical bonds Nature of the covalent bond Conjugated 1,3-diene system – butadiene Aromatic system – benzene	Atomic structure Types of chemical bonds Nature of the covalent bond Conjugated 1,3-diene system – butadiene Aromatic system – benzene

TEACHING UNIT 3 (WEEK THREE):

ELECTRONIC EFFECTS IN ORGANIC MOLECULES

lectures: 3 hours	small-group work: 2 hours
Polarity of covalent bonds Inductive effects Resonance	Polarity of covalent bonds Inductive effects Resonance

TEACHING UNIT 4 (WEEK FOUR):

ELECTROMERIC EFFECT. HYPERCONJUGATION. AROMATICITY.

lectures: 3 hours	small-group work: 2 hours
Electromeric effect Hyperconjugation Aromaticity (aromatic character)	Electromeric effect Hyperconjugation Aromaticity (aromatic character)

TEACHING UNIT 5 (WEEK FIVE):

STEREOCHEMISTRY.

lectures: 3 hours	small-group work: 2 hours
Factors affecting configuration Asymmetric atoms as a cause of enantiomeric stereoisomerism Configuration Racemic modifications	Factors affecting configuration Asymmetric atoms as a cause of enantiomeric stereoisomerism Configuration Racemic modifications

MODULE TWO: STEREOCHEMISTRY OF ACYCLIC, CYCLIC AND UNSATURATED COMPOUNDS. INTERMOLECULAR FORCES. ACID-BASE EQUILIBRIUM SYSTEMS IN ORGANIC CHEMISTRY.

TEACHING UNIT 6 (WEEK SIX):

STEREOCHEMISTRY OF ACYCLIC COMPOUNDS

lectures: 3 hours	small-group work: 2 hours
Asymmetric synthesis Walden inversion Conformations of acyclic compounds	Asymmetric synthesis Walden inversion Conformations of acyclic compounds

TEACHING UNIT 7 (WEEK SEVEN):

STEREOCHEMISTRY OF UNSATURATED AND CYCLIC COMPOUNDS

lectures: 3 hours	small-group work: 2 hours
Stereoisomerism in unsaturated compounds Stereochemistry of cyclic compounds	Stereoisomerism in unsaturated compounds Stereochemistry of cyclic compounds

TEACHING UNIT 8 (WEEK EIGHT):

INTERMOLECULAR FORCES

lectures: 3 hours	small-group work: 2 hours
van der Waals forces Hydrogen bonding Organic molecular complexes	van der Waals forces Hydrogen bonding Organic molecular complexes

TEACHING UNIT 9 (WEEK NINE):

ACID-BASE EQUILIBRIUM SYSTEMS IN ORGANIC CHEMISTRY.

lectures: 3 hours	small-group work: 2 hours
Definitions and general properties of acids and bases Effect of structure on the acidity of organic compounds	Definitions and general properties of acids and bases Effect of structure on the acidity of organic compounds

TEACHING UNIT 10 (WEEK TEN):

BASICITY OF ORGANIC COMPOUNDS.

lectures: 3 hours	small-group work: 2 hours
Effect of structure on the basicity of organic compounds Tautomerism	Effect of structure on the basicity of organic compounds Tautomerism

MODULE THREE: HETEROCYCLIC COMPOUNDS WITH ONE AND TWO HETEROATOMS

TEACHING UNIT 11 (WEEK ELEVEN):

CLASSIFICATION AND NOMENCLATURE, GENERAL PRINCIPLES OF HETEROCYCLE SYNTHESIS

lectures: 3 hours	small-group work: 2 hours
Classification and nomenclature; general principles of heterocycle synthesis.	General principles of the synthesis of heterocyclic compounds.

TEACHING UNIT 12 (WEEK TWELVE):

FIVE-MEMBERED HETEROCYCLES WITH ONE HETEROATOM

lectures: 3 hours	small-group work: 2 hours
Five-membered heterocycles with one heteroatom	Five-membered heterocycles with one heteroatom as the structural basis of important pharmaceuticals.

TEACHING UNIT 13 (WEEK THIRTEEN):

SIX-MEMBERED HETEROCYCLES WITH ONE HETEROATOM

lectures: 3 hours	small-group work: 2 hours
Six-membered heterocycles with one heteroatom.	Six-membered heterocycles with one heteroatom as the structural basis of important pharmaceuticals.

TEACHING UNIT 14 (WEEK FOURTEEN):

BENZOPYRIDINES, FIVE-MEMBERED HETEROCYCLES WITH TWO HETEROATOMS

lectures: 3 hours	small-group work: 2 hours
Benzopyridines, five-membered heterocycles with two heteroatoms.	Benzopyridines and five-membered heterocycles with two heteroatoms as the structural basis of important pharmaceuticals.

TEACHING UNIT 15 (WEEK FIFTEEN):

SIX-MEMBERED HETEROCYCLES WITH TWO HETEROATOMS

lectures: 3 hours	small-group work: 2 hours
Six-membered heterocycles with two heteroatoms.	Six-membered heterocycles with two heteroatoms as the structural basis of important pharmaceuticals.

LECTURE SCHEDULE

--

PRACTICAL CLASS SCHEDULE

module	week	type	name of the teaching unit	teacher
1	1	L	Structures of organic compounds. Organic reactions.	Dr Andriana M. Bukonjić, Assistant Professor Dr Snežana Jovanović Stević, Assistant Professor Dr Ana S. Živanović, Assistant Professor
		P	Structures of organic compounds. Organic reactions.	Dr Andriana M. Bukonjić, Assistant Professor Dr Snežana Jovanović Stević, Assistant Professor Dr Ana S. Živanović, Assistant Professor
	2	L	Chemical bonding.	Dr Andriana M. Bukonjić, Assistant Professor Dr Snežana Jovanović Stević, Assistant Professor Dr Ana S. Živanović, Assistant Professor
		P	Chemical bonding.	Dr Andriana M. Bukonjić, Assistant Professor Dr Snežana Jovanović Stević, Assistant Professor Dr Ana S. Živanović, Assistant Professor
	3	L	Electronic effects in organic molecules.	Dr Andriana M. Bukonjić, Assistant Professor Dr Snežana Jovanović Stević, Assistant Professor Dr Ana S. Živanović, Assistant Professor
		P	Electronic effects in organic molecules.	Dr Andriana M. Bukonjić, Assistant Professor Dr Snežana Jovanović Stević, Assistant Professor Dr Ana S. Živanović, Assistant Professor
	4	L	Electromeric effect. Hyperconjugation. Aromaticity.	Dr Andriana M. Bukonjić, Assistant Professor Dr Snežana Jovanović Stević, Assistant Professor Dr Ana S. Živanović, Assistant Professor
		P	Electromeric effect. Hyperconjugation. Aromaticity.	Dr Andriana M. Bukonjić, Assistant Professor Dr Snežana Jovanović Stević, Assistant Professor Dr Ana S. Živanović, Assistant Professor
	5	L	Stereochemistry.	Dr Andriana M. Bukonjić, Assistant Professor Dr Snežana Jovanović Stević, Assistant Professor Dr Ana S. Živanović, Assistant Professor
		P	Stereochemistry.	Dr Andriana M. Bukonjić, Assistant Professor Dr Snežana Jovanović Stević, Assistant Professor Dr Ana S. Živanović, Assistant Professor
2	6	L	Stereochemistry of acyclic compounds.	Dr Andriana M. Bukonjić, Assistant Professor Dr Snežana Jovanović Stević, Assistant Professor Dr Ana S. Živanović, Assistant Professor
		P	Stereochemistry of acyclic compounds.	Dr Andriana M. Bukonjić, Assistant Professor Dr Snežana Jovanović Stević, Assistant Professor Dr Ana S. Živanović, Assistant Professor

3	7	L	Stereochemistry of unsaturated and cyclic compounds.	Dr Andriana M. Bukonjić, Assistant Professor Dr Snežana Jovanović Stević, Assistant Professor Dr Ana S. Živanović, Assistant Professor
		P	Stereochemistry of unsaturated and cyclic compounds.	Dr Andriana M. Bukonjić, Assistant Professor Dr Snežana Jovanović Stević, Assistant Professor Dr Ana S. Živanović, Assistant Professor
	8	L	Intermolecular forces.	Dr Andriana M. Bukonjić, Assistant Professor Dr Snežana Jovanović Stević, Assistant Professor Dr Ana S. Živanović, Assistant Professor
		P	Intermolecular forces.	Dr Andriana M. Bukonjić, Assistant Professor Dr Snežana Jovanović Stević, Assistant Professor Dr Ana S. Živanović, Assistant Professor
	9	L	Acid-base equilibrium systems in organic chemistry.	Dr Andriana M. Bukonjić, Assistant Professor Dr Snežana Jovanović Stević, Assistant Professor Dr Ana S. Živanović, Assistant Professor
		P	Acid-base equilibrium systems in organic chemistry.	Dr Andriana M. Bukonjić, Assistant Professor Dr Snežana Jovanović Stević, Assistant Professor Dr Ana S. Živanović, Assistant Professor
	10	L	Basicity of organic compounds.	Dr Andriana M. Bukonjić, Assistant Professor Dr Snežana Jovanović Stević, Assistant Professor Dr Ana S. Živanović, Assistant Professor
		P	Basicity of organic compounds.	Dr Andriana M. Bukonjić, Assistant Professor Dr Snežana Jovanović Stević, Assistant Professor Dr Ana S. Živanović, Assistant Professor
	11	L	Heterocyclic compounds (classification and nomenclature, general principles of heterocycle synthesis).	Dr Andriana M. Bukonjić, Assistant Professor Dr Snežana Jovanović Stević, Assistant Professor Dr Ana S. Živanović, Assistant Professor
		P	Heterocyclic compounds (classification and nomenclature, general principles of heterocycle synthesis).	Dr Andriana M. Bukonjić, Assistant Professor Dr Snežana Jovanović Stević, Assistant Professor Dr Ana S. Živanović, Assistant Professor
	12	L	Five-membered heterocycles with one heteroatom.	Dr Andriana M. Bukonjić, Assistant Professor Dr Snežana Jovanović Stević, Assistant Professor Dr Ana S. Živanović, Assistant Professor
		P	Five-membered heterocycles with one heteroatom.	Dr Andriana M. Bukonjić, Assistant Professor Dr Snežana Jovanović Stević, Assistant Professor Dr Ana S. Živanović, Assistant Professor

	13	L	Six-membered heterocycles with one heteroatom.	Dr Andriana M. Bukonjić, Assistant Professor Dr Snežana Jovanović Stević, Assistant Professor Dr Ana S. Živanović, Assistant Professor
		P	Six-membered heterocycles with one heteroatom.	Dr Andriana M. Bukonjić, Assistant Professor Dr Snežana Jovanović Stević, Assistant Professor Dr Ana S. Živanović, Assistant Professor
	14	L	Benzopyridines, five-membered heterocycles with two heteroatoms.	Dr Andriana M. Bukonjić, Assistant Professor Dr Snežana Jovanović Stević, Assistant Professor Dr Ana S. Živanović, Assistant Professor
		P	Benzopyridines, five-membered heterocycles with two heteroatoms.	Dr Andriana M. Bukonjić, Assistant Professor Dr Snežana Jovanović Stević, Assistant Professor Dr Ana S. Živanović, Assistant Professor
	15	L	Six-membered heterocycles with two heteroatoms.	Dr Andriana M. Bukonjić, Assistant Professor Dr Snežana Jovanović Stević, Assistant Professor Dr Ana S. Živanović, Assistant Professor
		P	Six-membered heterocycles with two heteroatoms.	Dr Andriana M. Bukonjić, Assistant Professor Dr Snežana Jovanović Stević, Assistant Professor Dr Ana S. Živanović, Assistant Professor